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Alternate #

SUBJECT

RATIONALE FOR A HOLE IN THE SOFIA HANGAR ROOF

PROJECT SOFIA

DISTRIBUTION

Rationale for a Hole in the SOFIA Hangar Roof
E. F. Erickson, 7/17/91

It has been demonstrated on the KAO that viewing stars from the ground with the telescope is valuable for telescope and often for focal plane instrument calibration, testing, and checkout. The procedure is called a "line-op", which is typically done with the aircraft oriented so that the telescope can point at Polaris, although other star fields are sometimes requested by investigators in preparation for particular airborne observations.

For the telescope, line-ops are performed after any significant work on the telescope prior to flight. For example, verification of the pointing system, focussing or alignment of the acquisition or tracker cameras, measurement of camera sensitivity, and verification of the telescope mirrors' alignment are all done on line-ops.

Many experimenters use line-ops to verify the operation of their instruments with the telescope. Some are reluctant to fly without this procedure, which - for some instruments - permits determination of the overall system performance better than the artifical means which have been developed. Forming an image using the full telescope aperture is easy using a star as a source. An equivalent artifical source would be expensive and cumbersome for the KAO, and is not practical for SOFIA.

However, the line-op is not efficient, because the plane must be moved out of the hangar. This means turning off power, disrupting activities of people working inside and outside the plane, pushing the plane back and orienting it on the ramp to observe the desired star field, hooking up power and compressed air (or running the compressors on the ramp), etc. In addition, the C-141 nose gear has experienced significant additional wear due to its use during line-ops, especially when the aircraft is fueled for flight. On SOFIA this will be most of the time, since the plan calls for fueling after landing, a very efficient procedure.

The hole in the SOFIA hangar roof would permit most of the advantages of a line-op while eliminating all of the disadvantages. Even if Polaris were not available through the hole, the ability to see stars would allow most of the required tests to be accomplished, would disturb the ongoing activities in and around the aircraft far less, and would minimize wear on the nose gear. The high flight rate planned for SOFIA can be achieved with minimum operational effort if capabilities such as the hole in the roof are available. This is why the SOFIA Science Working Group unanimously endorsed the concept when discussed at its meeting in December 1990.